REMARKS

Very thanks for Examination's suggestion and thanks for finding some citations about the present invention, thereby, the applicant may know more information about the invention. This case has been carefully reviewed and analyzed in view of the office action.

Responsive to the objections and rejections made of the Examiner in office action. We have amended the specification, claims and abstracts. All the errors disclosed in that office action has been corrected according to the Examiner's indications disclosed in the official action.

Examiner has kindly provides reference prior arts about the present invention, and thus the applicant has more information about the invention. All details of the reference prior arts are fully considered and compared with the present invention.

Indeed the citations disclose some features of the present invention, and the applicant agrees with these viewpoints, however applicant discovers that some main features of the present invention is not disclosed in the citation which can form the novelty and inventive step of the present invention.

Firstly, applicant decides to cancel Claims 1 to 20, without prejudice or disclaimer of the subject matter thereof, and add new claims 21 to 30.

The added new claim 21 is based on the original claim 1, 3, 4, 5, 7, 8, 10 and 14, that is, to combine the features of claims 1, 6 and 7, but some description is modified based on Figs. 1 and 2 of the present invention. The new claim 22 add features same as the original claim 6 to the new claims 21. The new claim 23 add features same as the original claim 11 to the new claims 21. The new claim 24 add features same as the original claim 13 to the new claims 21. The new claim 25 add features same as the original claim 15 to the new claims 21.

The added new claim 26 is based on the original claim 1, 3, 12, 5, 7, 8, 10 and 14, that is, to combine the features of claims 1, 6 and 7, but some

description is modified based on Figs. 12 and 13 of the present invention. The new claim 27 add features same as the original claim 6 to the new claims 26. The new claim 28 add features same as the original claim 11 to the new claims 26. The new claim 29 add features same as the original claim 13 to the new claims 26. The new claim 30 add features same as the original claim 15 to the new claims 26.

Thereby, it is assured that the new claims are based on the original claim and specification and thus no new matter is added. The relation of the new claims with respect to the original claims are shown in the following.

LIST OF CLAIMS:

Claims 1 to 20 (Cancelled)

Claim 21 (New claim, the combination of original claims 1, 3, 4, 5, 7, 8, 10 and 14) A hand tool comprising:

a retractable shank including a rod assembly ~~movable rod~~ having an outer wall formed with an axially ~~a longitudinally~~ arranged slideway and a plurality of radial circumferential ~~transversely arranged~~ limit grooves intersecting the slideways ~~in a vertical manner~~; wherein the sideway is a recess and each groove is a whole circle enclosing a periphery of the retractable shank;

a handle telescopically mounted on the retractable shank; and

at least one fixing pin extended through the handle and having a distal end slidably mounted in the slideway of the rod assembly ~~movable rod~~ of the retractable shank and slidably positioned in either one of the limit grooves of the rod assembly ~~movable rod~~ of the retractable shank;~~,~~

(from claim 3) wherein each of the limit grooves has an end

provided with a protruding stop portion for stopping and positioning the fixing pin;

(from claim 4) wherein an elastic member mounted between the retractable shank and the handle;

(from claim 5) wherein the handle has an inside formed with a receiving chamber for receiving the movable rod of the retractable shank and the elastic member;

(from claim 7) wherein the handle has a periphery formed with at least one through hole for receiving the fixing pin;

(from claim 8) wherein the handle has an inside formed with a receiving chamber, and the through hole of the handle communicates with the receiving chamber of the handle;

(from claim 10) wherein each of the limit grooves ~~of the movable rod of the retractable shank~~ has a wall formed with a positioning recess extended downward for positioning the fixing pin; and

(from claim 14) wherein the retractable shank includes a driving portion mounted on one end of the movable rod.

~~2. The hand tool in accordance with claim 1, wherein the limit grooves are in parallel with each other.~~

~~3. The hand tool in accordance with claim 1, wherein each of the limit grooves has an end provided with a protruding stop portion for stopping and positioning the fixing pin.~~

~~4. The hand tool in accordance with claim 1, further comprising an elastic member mounted between the retractable shank and the handle.~~

~~5. The hand tool in accordance with claim 4, wherein the handle has an inside formed with a receiving chamber for receiving the movable rod of the retractable shank and the elastic member.~~

Claim 22 ~~6.~~ (New claim, original claim 6) The hand tool

in accordance with claim 1 ~~5~~, wherein the distal end of the fixing pin is extended into the receiving chamber of the handle.

~~7. The hand tool in accordance with claim 1, wherein the handle has a periphery formed with at least one through hole for receiving the fixing pin.~~

~~8. The hand tool in accordance with claim 7, wherein the handle has an inside formed with a receiving chamber, and the through hole of the handle communicates with the receiving chamber of the handle.~~

~~9. The hand tool in accordance with claim 1, wherein the movable rod of the retractable shank can be retracted into and expanded outward from the receiving chamber of the handle, so as to adjust the distance between the retractable shank and the handle.~~

~~10. The hand tool in accordance with claim 1, wherein each of the limit grooves of the movable rod of the retractable shank has a wall formed with a positioning recess extended downward for positioning the fixing pin.~~

Claim 23 ~~11.~~ (New claim, original claim 11) The hand tool in accordance with claim 1 ~~10~~, wherein ~~the~~ each of the limit grooves has an end provided with a protruding stop portion, and the positioning recess is located adjacent to the stop portion.

~~12. The hand tool in accordance with claim 1, further comprising first magnetic member mounted on a distal end of the movable rod of the retractable shank, and a second magnetic member mounted on a bottom of the handle and having a polarity the same as that of the first magnetic member, so that the first magnetic member is repulsive with the second magnetic member.~~

Claim 24 ~~13.~~ (New claim, original claim 6) The hand tool in accordance with claim 1, wherein the handle has an end provided with a second driving portion.

~~14. The hand tool in accordance with claim 1, wherein the retractable shank includes a driving portion mounted on one end of the movable rod.~~

Claim 25 ~~15.~~ (New claim, original claim 15) The hand tool in accordance with claim 1 ~~14~~, wherein the driving portion of the retractable shank is selected from one of a ratchet wrench, a socket wrench, a direction controllable socket wrench, a screwdriver hand, a box-ended wrench, and an open-ended wrench.

~~16. The hand tool in accordance with claim 14, wherein the driving portion of the retractable shank is a socket wrench.~~

~~17. The hand tool in accordance with claim 14, wherein the driving portion of the retractable shank is a direction controllable socket wrench.~~

~~18. The hand tool in accordance with claim 14, wherein the driving portion of the retractable shank is a screwdriver hand.~~

~~19. The hand tool in accordance with claim 14, wherein the driving portion of the retractable shank is a box-ended wrench.~~

~~20. The hand tool in accordance with claim 14, wherein the driving portion of the retractable shank is an open-ended wrench.~~

Claim 26 (New claim, the combination of original claims, 3, 12, 5, 7, 8, 10 and 14) A hand tool comprising:

a retractable shank including a rod assembly ~~movable rod~~ having an outer wall formed with an axially ~~a longitudinally~~ arranged slideway and a plurality of radial circumferential ~~transversely arranged~~ limit grooves intersecting the slideways ~~in a vertical manner~~; wherein the sideway is a recess and each groove is a whole circle enclosing a periphery of the retractable

shank;

a handle telescopically mounted on the retractable shank; and

at least one fixing pin extended through the handle and having a distal end slidably mounted in the slideway of the rod assembly ~~movable rod~~ of the retractable shank and slidably positioned in either one of the limit grooves of the rod assembly ~~movable rod~~ of the retractable shank;~~.~~

(from claim 3) wherein each of the limit grooves has an end provided with a protruding stop portion for stopping and positioning the fixing pin;

(from claim 12) wherein a first magnetic member mounted on a distal end of the movable rod of the retractable shank, and a second magnetic member mounted on a bottom of the handle and having a polarity the same as that of the first magnetic member, so that the first magnetic member is repulsive with the second magnetic member;

(from claim 5) wherein the handle has an inside formed with a receiving chamber for receiving the movable rod of the retractable shank and the elastic member;

(from claim 7) wherein the handle has a periphery formed with at least one through hole for receiving the fixing pin;

(from claim 8) wherein the handle has an inside formed with a receiving chamber, and the through hole of the handle communicates with the receiving chamber of the handle;

(from claim 10) wherein each of the limit grooves ~~of the movable rod of the retractable shank~~ has a wall formed with a positioning recess extended downward for positioning the fixing pin; and

(from claim 14) wherein the retractable shank includes a driving portion mounted on one end of the movable rod.

Claim 27 ~~6.~~ (New claim, original claim 6) The hand tool in accordance with claim 26 ~~5~~, wherein the distal end of the fixing pin is extended into the receiving chamber of the handle.

Claim 28 ~~11.~~ (New claim, original claim 11) The hand tool in accordance with claim 26 ~~10~~, wherein ~~the~~ each of the limit grooves has an end provided with a protruding stop portion, and the positioning recess is located adjacent to the stop portion.

Claim 29 ~~13.~~ (New claim, original claim 6) The hand tool in accordance with claim 26 ~~1~~, wherein the handle has an end provided with a second driving portion.

Claim 30 ~~15.~~ (New claim, original claim 15) The hand tool in accordance with claim 26 ~~14~~, wherein the driving portion of the retractable shank is selected from one of a ratchet wrench, a socket wrench, a direction controllable socket wrench, a screwdriver hand, a box-ended wrench, and an open-ended wrench.

(A) Explain of the Amendment of the Claim

(1) Movable rod is amended as **rod assembly**. This just amends the name of the rod 22 as suggested by the Examiner in the office action. No substantial change is made to the invention.

(2) The longitudinally arranged slideway is amended as the **axially arranged slideway**. From all the drawings, it is illustrated that all the sideways 23 are arranged axially.

(3) The description of transverselly arranged limit grooves 24 is amended as **radial circumferential limit grooves**. From all the drawings, it is illustrated that all the sideways 23 are arranged axially.

(4) Description of "**in a vertical manner**" is cancelled. Since the amendments of (2) and (3) make this description being meaningless.

(5) A Description of "**wherein the sideway is a recess and each groove is a whole circle enclosing a periphery of the retractable shank;**" is added. This can be proved from all the drawings of the present invention.

Thereby, from above discussion, it is assured that the amendments are within the scope of the original claims and drawings and thus no new matter is added.

(B) Discussion of the Novelty of the Present Invention

The new claim 1 includes the features shown in Figs. 1 to 4 of the present invention.

For the rejection by U. S. patent No. 1,284,351, we have amended the part in the original claims 1 (now that part is incorporated in the new claims 21 and 25), see (1), (2), (3) and (4) is part (A), that is:

(1) Movable rod is amended as **rod assembly**.

(2) The longitudinally arranged slideway is amended as the **axially arranged slideway**.

(3) The description of transverselly arranged limit grooves 24 is amended as **radial circumferential limit grooves**.

(4) Description of "**in a vertical manner**" is cancelled.

(5) Description of "**wherein the sideway is a recess and each groove is a whole circle enclosing a periphery of the retractable shank;**"

However, above amendments made the present invention being different from the citation '251. In '251, the groove 20 is not a whole circle.

However, the features from the amendments in (1) to (4) have not seen in any of the citations.

For the first independent claim 21 of the present invention, in the added part of the original claims 3, 4, 5, 7, 8, 10, and 14 causes that the structure defined in claim 21 is like those illustrated in Figs. 1 to 4 of the

present invention. However, in the structures of the citation reference '251 and U. S. patent No. 1,431,805, the citation '251 is completely different from the claim 1, and the patent '805 has no the rod assembly 22 and related structure of the present invention and moreover '805 has no structure about the rod assembly 22 of the present invention.

Furthermore, for another independent claim 26, the same reason as above can be used to explain the novelty of the present invention, just the spring is replaced by the magnetic members. However, the USP 6,666,114 only has the structure of the magnetic members, but it cannot present all the functions of the present invention.

Moreover, in claims 21 and 26 of the present invention, the retractable shank of the present invention has a driving portion. Although the USP 4,409,886 has such a function, but it has no other functions in the two claims 21, 26 of the present invention.

In summary, for the independent claims 21, 26 of the present invention, no any citation has the function of the rod assembly 22 (which has been amended from the original claim 1 so as to differ from the USP 1,284,351). Although other citations have part of the claims 21, 26, they have no whole function of the present invention. Thus, they cannot provide the convenience in the operation as the present invention is combined with other hand tool.

(C) RESULT

Since in above discussion, it is apparent that no prior art has the features of the present invention, especially in new claims 21, 26. Furthermore, as we know that no other prior art has features of the present invention. Thus, the present invention is novel and inventive.

Applicant requests and authorizes Examiner to amend the claims of the present invention so that the claim can match the requirement of U. S. Patent. Attentions of Examiner to this matter is greatly

appreciated.

It is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectively requested.

Respectfully submitted.

Dated: 07 / 4 /2004

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"MARK-UP" COPY OF THE AMENDED SPECIFICATION

HAND TOOL HAVING RETRACTABLE HANDLE STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the invention

   The present invention relates to a handle tool, and more particularly to a handle tool having a retractable handle structure.

2. Description of the Related Art

A conventional handle tool, such as the wrench, screwdriver, socket or the like, usually comprises a handle and a driving portion mounted on one end of the handle. However, the handle has a fixed length, so that the working length of the conventional handle tool is fixed and cannot be adjusted, thereby limiting the versatility of the conventional hand tool.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a handle tool having a retractable handle structure.

Another objective of the present invention is to provide a handle tool, wherein the rod assembly ~~movable rod~~ of the retractable shank can be retracted into and expanded outward from the receiving chamber of the handle, so as to adjust the distance between the retractable shank and the handle, so that the working length of the handle tool can be adjusted easily, rapidly and arbitrarily.

A further objective of the present invention is to provide a handle tool, wherein each of the limiting grooves of the rod assembly ~~movable rod~~ of the retractable shank has a wall formed with a positioning recess for positioning the fixing pin by the restoring force of the elastic member, so that the rod assembly ~~movable rod~~ of the retractable shank is fixed o the handle rigidly and stably.

In accordance with the present invention, there is provided a handle

tool comprising:

a retractable shank including a rod assembly ~~movable rod~~ having an outer wall formed with a longitudially arranged sideway and a plurality of transversally arranged limiting grooves intersecting the sideways ~~in a vertically manner~~;

a handle telescopically mounted on the retractable shank; and

at least one fixing pin extended through the handle and having a distal end slidably mounted in the slideway of the rod assembly ~~movable rod~~ of the retractable shank and slidably positioned in either one of the limit grooves of the rod assembly ~~movable rod~~ of the retractable shank..

Further benefits and advantages of the present invention will become apparent after a careful reading of the details description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded perspective view of the handle tool in accordance with the preferred embodiment of the present invention;

Fig. 2 is a perspective assembled view of the handle tool as shown in Fig. 1;

Fig. 3 is a schematic operational view of the handle tool as shown in Fig. 2;

Fig. 4 is a schematic operational view of the handle tool as shown in Fig. 3;

Fig. 5 is a plan cross-sectional view of the handle tool as shown in Fig. 2;

Fig. 6 is a plane cross-sectional view of the handle tool as shown in Fig. 3;

Fig. 7 is a cross-sectional view of the handle tool taken along line 7-7 as shown in Fig. 6;

Fig. 8 is a plan cross-sectional view of the handle tool taken along line 9-9 as shown in Fig. 4;

Fig. 9 is a cross-sectional view of the handle tool taken along line 9-9 as shown in Fig. 8;

Fig. 10 is a perspective view of a handle tool in accordance with another embodiment of the present invention;

Fig. 11 is a schematic operational view of the handle tool as shown in Fig. 10;

Fig. 12 is an exploded perspective view of a handle tool in accordance with another embodiment of the present invention;

Fig. 13 is a perspective assembled view of the handle tool as shown in Fig. 12;

Fig. 14 is a perspective view of a handle tool in accordance with another embodiment of the present invention;

Fig. 15 is a perspective view of a handle tool in accordance with another embodiment of the present invention.

Fig. 16 is a perspective view of a handle tool accordance with another embodiment of the present invention.

Fig. 17 is a perspective view of a handle tool accordance with another embodiment of the present invention.

Fig. 18 is a perspective view of a handle tool accordance with another embodiment of the present invention.

Fig. 19 is a perspective view of a handle tool accordance with another embodiment of the present invention.

DETAIL DESCRIPTION OF THE DRAWING

Referring to drawings and initially to Figs. 1 and 2, a handle tool 10 in accordance with the preferred embodiment of the present invention comprises a retractable shank 20, a handle 30 telescopically mounted on the retractable shank 20 and an elastic member 40 (such as a spring) mounted between the retractable shank 20 and the handle 30.

The retractable shank 20 includes a rod assembly ~~movable rod~~ 22 and a driving portion 21 mounted on one end of the rod assembly ~~movable rod~~ 22.

The rod assembly ~~movable rod~~ 22 of the retractable shank 20 has an outer wall formed with two axially ~~longitudinally~~ arranged opposite sideway 23, a second transversally arranged limiting groove 24 intersecting the sideway 23 ~~in a vertically manner~~, a second radial circumferential ~~transversely arranged~~ arranged limiting groove 25 intersecting the sideways 23 ~~in a vertically manner~~, and a third transversally arranged limiting groove 26 intersecting the sideway 23 ~~in a vertical manner~~. Preferably, the three limiting grooves 24, 25, and 26 are in parallel with each other. In addition, each of the three limiting grooves 24, 25 and 26 has an end provided with a protruding stop portion 27. In the present invention, the sideway is a recess and each groove is a whole circle enclosing a periphery of the retractable shank.

The handle 30 has an inside formed with a receiving chamber 31 for receiving the rod assembly ~~movable rod~~ 22 of the retractable shank 20 and the elastic member 40.

The handle tool 10 further comprises two fixing pins 33 each extended through the handle 30 and each having a distal end slidably mounted in the respective sideway 23 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20 and slidably positioned in either one of the three limiting grooves 24, 25 and 26. Preferably, the distal end of each of the two fixing pins 33 is extended into the receiving chamber 31 of the handle 30. In addition, the distal end of each of the two fixing pins 33 is stopped by the stop portion 27 of either one of the three limiting grooves 24, 25 and 26 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20.

The handle 30 has a periphery formed with two opposite through holes 32 for receiving the two fixing pins 33. Preferably, each of two opposite through holes 32 of the handle 30 communicates with the receiving chamber 31 of the handle 30.

In operation, referring to Figs. 3 – 9 with reference to Figs. 1 and 2, each of the two fixing pins 33 is initially received in the third limiting

groove 26 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20.

Then, the handle 30 is rotated relative to the rod assembly ~~movable rod~~ 22 of the retractable shank 20, so that each of the two fixing pins 33 is moved in the third limiting groove 26 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20 to the position as shown in Figs. 2 and 5, where each of the two fixing pins 33 is aligned with the respective sideway 23 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20.

Then, the rod assembly ~~movable rod~~ 22 of the retractable shank 20 is pressed to be retracted into the receiving chamber 31 of the handle 30, so that each of the two fixing pins 33 is moved in the respective sideway 23 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20 from the position as shown in Fig. 2 to the position as shown in Figs. 3, 6, and 7, where each of the two fixing pins 33 is aligned with the second limiting groove 25 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20.

Then, the handle 30 is rotated relative to the rod assembly ~~movable rod~~ 22 of the retractable shank 20, so that each of the two fixing pins 33 is moved into the second limiting groove 25 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20 and is stopped by the stop portion 27 of the second limiting groove 25 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20 as shown in Figs. 4, 8 and 9.

Thus, the rod assembly ~~movable rod~~ 22 of the retractable shank 20 can be retracted into and expanded outward from the receiving chamber 31 of the handle 30, so as to adjust the distance between the retractable shank 20 and the handle 30, so that the working length of the handle tool 10 can be adjusted easily, rapidly and arbitrarily.

Referring to Figs. 10 and 11, in accordance with another embodiment of the present invention, each of the three limiting grooves 24, 25 and 26 of the rod assembly ~~movable rod~~ 22 of the retractable shank 20 has a wall formed with a positioning recess 28 extended downward fro positioning the fixing pin 33 by the restoring force of the elastic member 40. Preferably, the positioning recess 28 is located adjacent to the stop portion

27.

Referring to Figs. 12 and 13, in accordance with another embodiment of the present invention, the elastic member 40 is undefined, and the handle tool 10 further comprises a first magnetic member 50 mounted on a distal end of the rod assembly ~~movable rod~~ 22 of the retractable shank 20, and a second magnetic member 50 mounted on a bottom of the handle 30 and having a polarity the same as that of the first magnetic member 50, so that the second magnetic member 50 is repulsive with the second magnetic member 50.

Referring to Fig. 14, in accordance with another embodiment of the present invention, the driving portion 21a of the retractable shank 20 is a ratchet wrench, and the handle 30 has an end provided with a driving portion 34.

Referring to Fig. 15, in accordance with another embodiment of the present invention, the driving portion 21b of the retractable shank 20 is a socket wrench.

Referring to Fig. 16, in accordance with another embodiment of the present invention, the driving portion 21c of the retractable shank 20 is a direction controllable socket wrench.

Referring to Fig. 17, in accordance with another embodiment of the present invention,. The driving portion 21d of the retractable shank 20 is a screwdriver head.

Referring to Fig. 18, in accordance with another the present invention of the present invention, the driving portion 21e of the retractable shank 20 is a box-ended wrench.

Referring to Fig. 19, in accordance with another embodiment of the present invention, the driving portion 21f of the retractable shank 20 is an open-ended wrench.

Although the invention has been explained in relation to its preferred embodiment(s) as mentioned above, it is to be understood that many other

possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended claim or claims will cover such modifications and variations that fall within the true scope of the invention.

ABSTRACT OF THE DISCLOSURE

A hand tool includes a retractable shank, a handle, an elastic member, and at least one fixing pin. Thus, the rod assembly ~~movable rod~~ of the retractable shank can be retracted into and expanded outward from the receiving chamber of the handle so as to adjust the distance between the retractable shank and the handle, so that the working length of the hand tool can be adjusted easily, rapidly and arbitrarily.

"CLEAN" COPY OF THE AMENDED SPECIFICATION

HAND TOOL HAVING RETRACTABLE HANDLE STRUCTURE

BACKGROUND OF THE INVENTION

2. Field of the invention

The present invention relates to a handle tool, and more particularly to a handle tool having a retractable handle structure.

2. Description of the Related Art

A conventional handle tool, such as the wrench, screwdriver, socket or the like, usually comprises a handle and a driving portion mounted on one end of the handle. However, the handle has a fixed length, so that the working length of the conventional handle tool is fixed and cannot be adjusted, thereby limiting the versatility of the conventional hand tool.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a handle tool having a retractable handle structure.

Another objective of the present invention is to provide a handle tool, wherein the rod assembly of the retractable shank can be retracted into and expanded outward from the receiving chamber of the handle, so as to adjust the distance between the retractable shank and the handle, so that the working length of the handle tool can be adjusted easily, rapidly and arbitrarily.

A further objective of the present invention is to provide a handle tool, wherein each of the limiting grooves of the rod assembly of the retractable shank has a wall formed with a positioning recess for positioning the fixing pin by the restoring force of the elastic member, so that the rod assembly of the retractable shank is fixed o the handle rigidly and stably.

In accordance with the present invention, there is provided a handle

tool comprising:

a retractable shank including a rod assembly having an outer wall formed with a longitudially arranged sideway and a plurality of transversally arranged limiting grooves intersecting the sideways;

a handle telescopically mounted on the retractable shank; and

at least one fixing pin extended through the handle and having a distal end slidably mounted in the slideway of the rod assembly of the retractable shank and slidably positioned in either one of the limit grooves of the rod assembly of the retractable shank..

Further benefits and advantages of the present invention will become apparent after a careful reading of the details description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded perspective view of the handle tool in accordance with the preferred embodiment of the present invention;

Fig. 2 is a perspective assembled view of the handle tool as shown in Fig. 1;

Fig. 3 is a schematic operational view of the handle tool as shown in Fig. 2;

Fig. 4 is a schematic operational view of the handle tool as shown in Fig. 3;

Fig. 5 is a plan cross-sectional view of the handle tool as shown in Fig. 2;

Fig. 6 is a plane cross-sectional view of the handle tool as shown in Fig. 3;

Fig. 7 is a cross-sectional view of the handle tool taken along line 7-7 as shown in Fig. 6;

Fig. 8 is a plan cross-sectional view of the handle tool taken along line 9-9 as shown in Fig. 4;

Fig. 9 is a cross-sectional view of the handle tool taken along line 9-9

as shown in Fig. 8;

Fig. 10 is a perspective view of a handle tool in accordance with another embodiment of the present invention;

Fig. 11 is a schematic operational view of the handle tool as shown in Fig. 10;

Fig. 12 is an exploded perspective view of a handle tool in accordance with another embodiment of the present invention;

Fig. 13 is a perspective assembled view of the handle tool as shown in Fig. 12;

Fig. 14 is a perspective view of a handle tool in accordance with another embodiment of the present invention;

Fig. 15 is a perspective view of a handle tool in accordance with another embodiment of the present invention.

Fig. 16 is a perspective view of a handle tool accordance with another embodiment of the present invention.

Fig. 17 is a perspective view of a handle tool accordance with another embodiment of the present invention.

Fig. 18 is a perspective view of a handle tool accordance with another embodiment of the present invention.

Fig. 19 is a perspective view of a handle tool accordance with another embodiment of the present invention.

DETAIL DESCRIPTION OF THE DRAWING

Referring to drawings and initially to Figs. 1 and 2, a handle tool 10 in accordance with the preferred embodiment of the present invention comprises a retractable shank 20, a handle 30 telescopically mounted on the retractable shank 20 and an elastic member 40 (such as a spring) mounted between the retractable shank 20 and the handle 30.

The retractable shank 20 includes a rod assembly 22 and a driving portion 21 mounted on one end of the rod assembly 22. The rod assembly 22 of the retractable shank 20 has an outer wall formed with two axially

arranged opposite sideway 23, a second transversally arranged limiting groove 24 intersecting the sideway 23, a second radial circumferential arranged limiting groove 25 intersecting the sideways 23, and a third transversally arranged limiting groove 26 intersecting the sideway 23. Preferably, the three limiting grooves 24, 25, and 26 are in parallel with each other. In addition, each of the three limiting grooves 24, 25 and 26 has an end provided with a protruding stop portion 27. In the present invention, the sideway is a recess and each groove is a whole circle enclosing a periphery of the retractable shank.

The handle 30 has an inside formed with a receiving chamber 31 for receiving the rod assembly 22 of the retractable shank 20 and the elastic member 40.

The handle tool 10 further comprises two fixing pins 33 each extended through the handle 30 and each having a distal end slidably mounted in the respective sideway 23 of the rod assembly 22 of the retractable shank 20 and slidably positioned in either one of the three limiting grooves 24, 25 and 26. Preferably, the distal end of each of the two fixing pins 33 is extended into the receiving chamber 31 of the handle 30. In addition, the distal end of each of the two fixing pins 33 is stopped by the stop portion 27 of either one of the three limiting grooves 24, 25 and 26 of the rod assembly 22 of the retractable shank 20.

The handle 30 has a periphery formed with two opposite through holes 32 for receiving the two fixing pins 33. Preferably, each of two opposite through holes 32 of the handle 30 communicates with the receiving chamber 31 of the handle 30.

In operation, referring to Figs. 3 – 9 with reference to Figs. 1 and 2, each of the two fixing pins 33 is initially received in the third limiting groove 26 of the rod assembly 22 of the retractable shank 20.

Then, the handle 30 is rotated relative to the rod assembly 22 of the retractable shank 20, so that each of the two fixing pins 33 is moved in the third limiting groove 26 of the rod assembly 22 of the retractable shank 20

to the position as shown in Figs. 2 and 5, where each of the two fixing pins 33 is aligned with the respective sideway 23 of the rod assembly 22 of the retractable shank 20.

Then, the rod assembly 22 of the retractable shank 20 is pressed to be retracted into the receiving chamber 31 of the handle 30, so that each of the two fixing pins 33 is moved in the respective sideway 23 of the rod assembly 22 of the retractable shank 20 from the position as shown in Fig. 2 to the position as shown in Figs. 3, 6, and 7, where each of the two fixing pins 33 is aligned with the second limiting groove 25 of the rod assembly 22 of the retractable shank 20.

Then, the handle 30 is rotated relative to the rod assembly 22 of the retractable shank 20, so that each of the two fixing pins 33 is moved into the second limiting groove 25 of the rod assembly 22 of the retractable shank 20 and is stopped by the stop portion 27 of the second limiting groove 25 of the rod assembly 22 of the retractable shank 20 as shown in Figs. 4, 8 and 9.

Thus, the rod assembly 22 of the retractable shank 20 can be retracted into and expanded outward from the receiving chamber 31 of the handle 30, so as to adjust the distance between the retractable shank 20 and the handle 30, so that the working length of the handle tool 10 can be adjusted easily, rapidly and arbitrarily.

Referring to Figs. 10 and 11, in accordance with another embodiment of the present invention, each of the three limiting grooves 24, 25 and 26 of the rod assembly 22 of the retractable shank 20 has a wall formed with a positioning recess 28 extended downward fro positioning the fixing pin 33 by the restoring force of the elastic member 40. Preferably, the positioning recess 28 is located adjacent to the stop portion 27.

Referring to Figs. 12 and 13, in accordance with another embodiment of the present invention, the elastic member 40 is undefined, and the handle tool 10 further comprises a first magnetic member 50 mounted on a distal end of the rod assembly 22 of the retractable shank 20, and a second

magnetic member 50 mounted on a bottom of the handle 30 and having a polarity the same as that of the first magnetic member 50, so that the second magnetic member 50 is repulsive with the second magnetic member 50.

Referring to Fig. 14, in accordance with another embodiment of the present invention, the driving portion 21a of the retractable shank 20 is a ratchet wrench, and the handle 30 has an end provided with a driving portion 34.

Referring to Fig. 15, in accordance with another embodiment of the present invention, the driving portion 21b of the retractable shank 20 is a socket wrench.

Referring to Fig. 16, in accordance with another embodiment of the present invention, the driving portion 21c of the retractable shank 20 is a direction controllable socket wrench.

Referring to Fig. 17, in accordance with another embodiment of the present invention,. The driving portion 21d of the retractable shank 20 is a screwdriver head.

Referring to Fig. 18, in accordance with another the present invention of the present invention, the driving portion 21e of the retractable shank 20 is a box-ended wrench.

Referring to Fig. 19, in accordance with another embodiment of the present invention, the driving portion 21f of the retractable shank 20 is an open-ended wrench.

Although the invention has been explained in relation to its preferred embodiment(s) as mentioned above, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended claim or claims will cover such modifications and variations that fall within the true scope of the invention.

ABSTRACT OF THE DISCLOSURE

A hand tool includes a retractable shank, a handle, an elastic member, and at least one fixing pin. Thus, the rod assembly of the retractable shank can be retracted into and expanded outward from the receiving chamber of the handle so as to adjust the distance between the retractable shank and the handle, so that the working length of the hand tool can be adjusted easily, rapidly and arbitrarily.